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Ice Flow in the North East Greenland Ice Stream

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As the use of satellite data for ice-sheet research has accelerated, new discoveries have changed the way that we think about ice discharge, and new tools have changed the way that we measure it. We have begun to apply a combination of remote sensing and ice sheet modeling techniques to study ice flow in the recently identified northeast Greenland ice stream. This ice stream shows evidence of organized flow far into the interior and has low-slope areas of rapid flow and regions of enhanced shear that resemble the ice streams of West Antarctica. The onset of rapid flow close to the ice divide and the evolution of its flow pattern, however, make this ice stream unique. Our investigation is aimed at increasing our understanding of this ice stream and its origins and role in the discharge of ice from the ice sheet and the effects that discharge may have on the history and evolution of the ice in northern Greenland.

The ice flow data comes from satellite radar interferometry tied to reference points. We have applied this technique to measure the velocity over the entire ice stream, which is more than 700 kilometers in length. The velocity contours reveal distinct, well-developed shear margins, which are coincident with linear features in the SAR-amplitude imagery. It is surprising to see such defined, enhanced flow so far inland and so close to the ice divide. The velocity data and topography data are being used to feed a modeling effort that allows us to study the dynamics and character rapid flow. We will present maps of flow velocity and other results derived from these data.

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